

CLAIMS

1. A process for production of an allyl and/or methallyl ether of a tri or polyhydric alcohol characterised in, that said process comprises the steps of
 - i) subjecting at least one cyclic formal of at least one tri or polyhydric alcohol to allylation by reaction with at least one allyl and/or methallyl halide in presence of a catalytically effective amount of at least one basic catalyst, whereby a reaction mixture, comprising at least one allyl and/or methallyl ether of said cyclic formal, is yielded, and
 - ii) subjecting in step (i) yielded allyl and/or methallyl ether of said cyclic formal to reaction with at least one alcohol, having one or more hydroxyl groups, optionally in presence of a catalytically effective amount of at least one organic acid catalyst, whereby a reaction mixture, comprising at least one allyl and/or methallyl ether of said tri or polyhydric alcohol and at least one formal of said alcohol, is yielded and optionally an intermediate purification step wherein the reaction mixture obtained in step (i) is purified prior to initiation of step (ii) and/or a final purification step wherein the reaction mixture obtained in step (ii) is purified.
2. A process according to Claim 1 characterised in, that said step (i) is performed at a temperature of 60-140°C.
3. A process according to Claim 1 or 2 characterised in, that said step (ii) is performed at a temperature of 80-160°C.
4. A process according to any of the Claims 1-3 characterised in, that said optional intermediate purification comprises extraction and optionally further purification by evaporation, such as distillation.
5. A process according to any of the Claims 1-4 characterised in, that said optional final purification step comprises purification of the reaction mixture obtained in step (ii) by evaporation, such as distillation.
6. A process according to any of the Claims 1-5 characterised in, that said at least one cyclic formal is a recovered by-product or is present in a mixture of by-products from a synthesis of a tri or polyalcohol.
7. A process according to any of the Claims 1-5 characterised in, that said at least one cyclic formal is recovered from a waste stream and/or a mixture of by-products from a synthesis of a tri or polyalcohol and optionally that said cyclic formal is purified.

8. A process according to any of the Claims 1-7 characterised in, that said at least one cyclic formal is at least one cyclic formal of a 1,2,3-propanetriol, 2-alkyl-2-hydroxyalkyl-1,3-propanediol, 2-alkyl-2-hydroxyalkoxy-1,3-propandiol, 2-alkyl-2-hydroxyalkoxyalkyl-1,3-propanediol, 2,2-dihydroxyalkyl-1,3-propanediol, 2,2-dihydroxyalkoxy-1,3-propanediol or 2,2-dihydroxyalkoxyalkyl-1,3-propanediol.
9. A process according to any of the Claims 1-7 characterised in, that said at least one cyclic formal is at least one cyclic formal of at least one dimer, trimer or polymer of a 1,2,3-propanetriol, 2-alkyl-2-hydroxyalkyl-1,3-propanediol, 2-alkyl-2-hydroxyalkoxy-1,3-propandiol, 2-alkyl-2-hydroxyalkoxyalkyl-1,3-propanediol, 2,2-dihydroxyalkyl-1,3-propanediol, 2,2-dihydroxyalkoxy-1,3-propanediol or 2,2-dihydroxyalkoxyalkyl-1,3-propanediol.
10. A process according to any of the Claims 1-9 characterised in, that said at least one cyclic formal is at least one cyclic formal of glycerol, trimethylolethane, trimethylolpropane, diglycerol, ditrimethylolethane, ditrimethylolpropane, pentaerythritol or dipentaerythritol.
11. A process according to any of the Claims 1-9 characterised in, that said at least one cyclic formal is at least one cyclic formal of an ethoxylated and/or propoxylated glycerol, trimethylolethane, trimethylolpropane, diglycerol, ditrimethylolethane, ditrimethylolpropane, pentaerythritol or dipentaerythritol.
12. A process according to any of the Claims 1-9 characterised in, that said at least one cyclic formal is at least one 4-hydroxyalkyl-1,3-dioxolane, 5-hydroxy-1,3-dioxane, 5-alkyl-5-hydroxy-1,3-dioxane, 5-alkyl-5-hydroxyalkyl-1,3-dioxane or 5,5-hydroxy-alkyl-1,3-dioxane.
13. A process according to Claim 12 characterised in, that said at least one cyclic formal is 5-hydroxy-1,3-dioxane, 5-methyl-5-hydroxymethyl-1,3-dioxane, 5-ethyl-5-hydroxymethyl-1,3-dioxane or 5,5-dihydroxymethyl-1,3-dioxane.
14. A process according to any of the Claims 1-13 characterised in, that said at least one allyl and/or methallyl halide is allyl and/or methallyl bromide and/or chloride.
15. A process according to any of the Claims 1-14 characterised in, that said at least one basic catalyst is at least one alkali and/or alkaline earth metal hydroxide, alkoxide and/or carbonate.
16. A process according to Claim 15 characterised in, that said at least one basic catalyst is potassium and/or sodium hydroxide, carbonate and/or methoxide.

17. A process according to any of the Claims 1-16 characterised in, that said at least one alcohol, having one or more hydroxyl groups, is at least one mono, di, tri or polyalcohol.
18. A process according to Claim 17 characterised in, that said at least one mono, di, tri or polyalcohol is an alkanol, an alkanediol, a 2,2-alkyl-1,3-propanediol, a 2-alkyl-2-hydroxyalkyl-1,3-propanediol, a 2,2-dihydroxyalkyl-1,3-propanediol or a dimer, trimer or polymer of a said alcohol.
19. A process according to Claim 17 or 18 characterised in, that said at least one mono, di, tri or polyalcohol is methanol, 2-ethylhexanediol, ethylene glycol, neopentyl glycol, trimethylolpropane and/or trimethylolethane.
20. A process according to any of the Claims 1-19 characterised in, that said at least one organic acid catalyst is *p*-toluenesulphonic acid and/or methanesulphonic acid.
21. A process according to any of the Claims 1-20 characterised in, that said at least one cyclic formal subjected to allylation in step (i) is 5,5-dihydroxymethyl-1,3-dioxane or a mixture, such as a waste stream, comprising 5,5-dihydroxymethyl-1,3-dioxane and that said alcohol, which in step (ii) is subjected to reaction with in step (i) yielded allyl and/or methallyl ether, is trimethylolpropane.
22. An allyl and/or methallyl ether of a tri or polyhydric alcohol characterised in, that it is yielded in the process of any of the Claims 1-21.
23. An allyl and/or methallyl ether according to Claim 22 characterised in, that that said allyl and/or methallyl ether is at least one monoallyl, diallyl, monomethallyl and/or dimethallyl ether of pentaerythritol.
24. A novel allyl and/or methallyl ether characterised in, that it is yielded in step (i) of the process according to Claim 1.
25. A novel allyl and/or methallyl ether according to Claim 24 characterised in, that said allyl and/or methallyl ether is at least one monoallyl, diallyl, monomethallyl and/or dimethallyl ether of 5,5-dihydroxymethyl-1,3-dioxane.
26. A novel allyl and/or methallyl ether according to Claim 25 characterised in, that said 5,5-dihydroxymethyl-1,3-dioxane is yielded as by-product in a synthesis of pentaerythritol.